CONTACTOR EQUIPPED WITH BOX TERMINALS

[0001] The present invention relates to a contactor having box terminals as set forth in the preamble of Claim 1.

[0002] Publication DE 3932502 A1 describes a three-pole contactor having a switching device housing including a bottom housing part, a top housing part and a housing cover. Contact straps protrude from the top housing part on each terminal side, the ends of said contact straps being surrounded by box terminals. The metallic box terminals are composed of a clamping box, a clamping bracket, and a clamping screw. On each terminal side, the box terminals are supported in a box-shaped terminal housing. The terminal housings are attachable to the top housing part via hook-shaped projections and are provided, on the terminal side, with insertion openings for conductors to be connected and, on the front side, with access openings for a screw tool for operating the clamping screws. According to EP 880198 A2, such box terminals are held via their clamping box by means of knobs on the inner walls of the terminal housing.

[0003] In a 3RT10, S3 type contactor made by the Siemens Company (company catalog no. LV10 2004 "Controlgear for Industry", dated August 26, 2003, pages 2/3, 5, 54, 98, 229), box terminals are inserted into a terminal housing toward the front side, held via their clamping boxes by means of knobs formed on the inner walls of the terminal housings, and slid from the terminal side over contact straps protruding out of a top housing part. The terminal housings can be latched to the top housing part by suitable latch means. A housing cover, which is to be attached with two screws, is placed onto the top housing part between the two terminal housings, thereby locking the terminal housings in place. In a 3RT10, S2 type contactor, also of the Siemens Company (ibid, pages 2/2, 5, 53, 97, 229), the box terminals are inserted into box terminals from the front side. The terminal housings latched to the top housing part are covered and locked in place on the front side by a housing cover which provided with access openings to the clamping screws and is to be attached to the top housing part with two screws.

[0004] DE 195 14 842 A1 discloses a process connector whose enclosure is composed of a base part onto which is placed a cover to complete the enclosure; the placement of the cover

being carried out after a printed circuit board has been inserted. The U-shaped cover is adapted to receive a multicontact process connector. Connection elements of this type are not suitable for high currents and mechanical loads, such as occur at connecting terminals of contactors.

[0005] DE 698 00 453 T2 (EP 896 387 B1) discloses a multipole electrical switching device having a switching device housing (not further detailed) and contact straps protruding from the terminal side thereof. Box terminals, which are received in a box-like terminal housing, have to be slid over the contact straps.

[0006] The terminal housing is attachable to the switching device housing and closable on the terminal side by a removable cover provided with cable entry openings.

[0007] To complete the known contactors in terms of their connection system, two terminal housings and one housing cover, which is to be attached to the top housing part, need to be installed in each case. In view of the above, it is the object of the present invention to simplify the completion of the connection system.

[0008] Starting from a contactor of the type mentioned at the outset, this objective is achieved according to the present invention by the features of the independent claim while advantageous refinements of the invention will be apparent from the dependent claims.

[0009] In accordance with the present invention, the terminal housings are integrated into a two-part housing cover, thereby reducing by one-third the number of housing parts needed to complete the connection system. The cover halves equipped with the box terminals can be attached to the top housing part in a simple manner.

[0010] For the assembly of the cover halves and the top housing part, it is advantageous to provide the side walls and the terminal housings with guide means and mating guide means, which are brought into operative contact, especially into clamping contact, with each other; in particular, to provide the side walls with guide ribs running parallel to the front side, and to provide the cover halves with guide grooves.

[0011] In an advantageous refinement of the present invention, the terminal-side cover legs, which are designed as terminal housings, are laterally embraced by the sidewalls of the top housing part, forming a snap-fit connection. In this connection, it is also advantageous if the side walls have formed therein the mating latch means that cooperate with the latch means provided on the terminal-side cover legs.

[0012] Further details and advantages of the present invention will become apparent from the exemplary embodiment described below with reference to the Figures, in which:

[0013] Figure 1 is an exploded view of the upper part of a contactor according to the present invention;

[0014] Figure 2 is an assembled view of the contactor according to Figure 1;

[0015] Figure 3 shows a cover half including the box terminals to be received, looking in a direction different from that in Figure 1 and Figure 2.

[0016] Figure 4 shows a cover half equipped with box terminals, looking in the same direction as in Figure 3;

[0017] Figure 5 shows the cover half including the box terminals to be received, looking in a direction different from that in Figure 3.

[0018] Figure 1 and Figure 2 show a top housing part 2 and two cover halves 4 and 6, which form part of the switching device housing of the three-pole contactor of the present invention. Top housing part 2 is placed onto a bottom housing part, but since it is not essential to the invention, it is not shown and accommodates the electromagnetic operating mechanism of the contactor. Contact straps 8 are secured in top part 2, said contact straps protruding outward on terminal sides 10 and 12, respectively. Inside top housing part 2, contact straps 8 end with

stationary contacts, which are connected and disconnected polewise by contact bridges (also not shown), said contact bridges being operated by the electromagnetic operating mechanism.

[0019] Cover halves 4 and 6 take the form of three-dimensional, right-angled members facing opposite each other. Cover halves 4 and 6 each include a front-side cover leg 16 which is level with front side 14 of the contactor, and a terminal-side cover leg 18 which is level with the respective terminal side 10 or 12.

[0020] Moreover, each terminal side 10 and 12 is provided with three box terminals 20. In usual fashion, metallic box terminals 20 are composed of a clamping box 22, a clamping bracket 24, and a clamping screw 26. According to Figure 3 and Figure 5, the box-shaped terminal-side cover legs 18 have parallelepiped-shaped receiving chambers 28 into which box terminals 20 are inserted opposite the front side 14. Thus, terminal-side cover legs 18 serve as a terminal housing. According to Figure 5, the inner walls of receiving chambers 28 are provided with pointed nose-shaped knobs 30, between which box terminals 20 are clampingly held via their clamping boxes 22.

[0021] The cover halves 4 and 8 equipped with box terminals 20 are slid onto top housing part 2 with a lateral movement toward contact straps 8. In the process, contact straps 8 are surrounded by clamping boxes 22. The inner sides of opposite side walls 32 of top housing part 2 are provided with guide means 34 taking the form of guide ribs and running parallel to front side 14. The lateral outer surfaces of front-side cover leg 16 are provided with mating guide means 36 taking the form of guide grooves and running parallel to front side 14. During the sliding-on of cover halves 4 and 6, guide means 34 are engaged with mating guide means 36. The lateral outer surfaces of terminal-side cover legs 18 each have formed thereon two latch means 38 in the form of latch knobs. During the sliding-on of cover halves 4 and 6, said latch means snap into two respective mating latch means 40 provided in the form of latch openings on the side walls 32, thereby firmly holding cover halves 4 and 6 on top housing part 2.

[0022] In the fully assembled condition of the contactor, the ends of conductors to be connected are inserted into box terminals 20 through insertion openings 42 formed in terminal-

side cover legs 18. Subsequently, the conductor ends are firmly clamped by tightening clamping screws 26 using a screw tool, which is inserted through access openings 44 provided in front-side cover legs 18.